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**From:** Ho, Yenhung [Ho.Yenhung@epa.gov]  
**Sent:** 10/23/2020 3:27:07 PM  
**To:** Albright, David [Albright.David@epa.gov]  
**Subject:** FW: [EXT] FW: Contract No. EP-C-15-022, WA No. 4-90; R9 UIC Tech Support -- Clean Energy Systems - Class VI UIC Permit Application # R9UIC-CA6-FY20-1 [Task 1; Subtask 1.2 - Permit Application Analysis]

Good morning David, see Shari's email below regarding whether we should add any new construction questions based on CalGEM's input. Thx.

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**From:** Shari Ring <Shari.Ring@cadmusgroup.com>  
**Sent:** Friday, October 23, 2020 5:37 AM  
**To:** Ho, Yenhung <Ho.Yenhung@epa.gov>; Rao, Kate <Rao.kate@epa.gov>  
**Subject:** RE: [EXT] FW: Contract No. EP-C-15-022, WA No. 4-90; R9 UIC Tech Support -- Clean Energy Systems - Class VI UIC Permit Application # R9UIC-CA6-FY20-1 [Task 1; Subtask 1.2 - Permit Application Analysis]

Hi Calvin

I checked with Jim about the well construction questions, and he said he didn't have anything to add to them. He thinks that the questions about corrosion performance data and subsurface safety valve testing are covered in the application and our comments.

He says he doesn't have any knowledge or insights on the other two (and they aren't things we usually ask about). I'm not even sure what the first one below means (maybe it is about seismic resistance?), so I am hesitant to suggest adding it. The other could be added if you want to.

- Can Schlumberger modify well designs to mitigate shallow compression while adhering to Federal Class VI regulations?
- Are capillary tubes used for installation of either fiber optics or other equipment external to the casing? If so, what is their internal diameter, and how will they be plugged at the end of well life?

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**From:** Ho, Yenhung <Ho.Yenhung@epa.gov>  
**Sent:** Wednesday, October 21, 2020 7:32 PM  
**To:** Shari Ring <Shari.Ring@cadmusgroup.com>; Rao, Kate <Rao.kate@epa.gov>  
**Cc:** Mary Ellen Tuccillo <maryellen.tuccillo@cadmusgroup.com>  
**Subject:** RE: [EXT] FW: Contract No. EP-C-15-022, WA No. 4-90; R9 UIC Tech Support -- Clean Energy Systems - Class VI UIC Permit Application # R9UIC-CA6-FY20-1 [Task 1; Subtask 1.2 - Permit Application Analysis]

Hi Shari,

The notes look good and capture all the items we discussed. Thanks.

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**From:** Shari Ring <Shari.Ring@cadmusgroup.com>  
**Sent:** Wednesday, October 21, 2020 12:50 PM  
**To:** Ho, Yenhung <Ho.Yenhung@epa.gov>; Rao, Kate <Rao.kate@epa.gov>  
**Cc:** MaryEllen.Tuccillo@cadmusgroup.com  
**Subject:** RE: [EXT] FW: Contract No. EP-C-15-022, WA No. 4-90; R9 UIC Tech Support -- Clean Energy Systems - Class VI UIC Permit Application # R9UIC-CA6-FY20-1 [Task 1; Subtask 1.2 - Permit Application Analysis]

Hi Calvin,

Below are quick notes of today's kick off call. Please let me know if you have any additions or corrections.

Cadmus will review all of CES's responses to the technical questions on the geology narrative. We will also review the applicant's responses to the pre operational testing objectives to confirm that EPA and CES have a common understanding.

Cadmus will hold off on reviewing the responses about ESA and NHPA for now. The information CES provided is more of a plan for conducting these analysis and not the analyses themselves.

Calvin asked Cadmus to let him know if the assigned LOE is sufficient. The tentative due date for evaluating the responses is December 4. This will be after CES responds to questions about AoR modeling and probably after the testing and monitoring responses are due.

If any of the questions discussed by the state on October 20 are not addressed by existing questions or the responses that CES provided, Cadmus will add these to our follow-up site characterization questions.

Cadmus will also review CalGEM's testing and monitoring and construction questions and let EPA know this week if we recommend including additional questions in the RAI that EPA plans to issue this week.

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**From:** Shari Ring

**Sent:** Wednesday, October 14, 2020 12:15 PM

**To:** Ho, Yenhung <[Ho.Yenhung@epa.gov](mailto:Ho.Yenhung@epa.gov)>; Rao, Kate <[Rao.kate@epa.gov](mailto:Rao.kate@epa.gov)>

**Cc:** Mary Ellen Tuccillo <[MaryEllen.Tuccillo@cadmusgroup.com](mailto:MaryEllen.Tuccillo@cadmusgroup.com)>

**Subject:** RE: [EXT] FW: Contract No. EP-C-15-022, WA No. 4-90; R9 UIC Tech Support -- Clean Energy Systems - Class VI UIC Permit Application # R9UIC-CA6-FY20-1 [Task 1; Subtask 1.2 - Permit Application Analysis]

Thanks. I just got the invitation.

We'll be happy to try to answer their questions. If they are too detailed to answer on the spot, we can either respond later or consider adding them to our follow up questions for CES based on reviewing the geology responses.

I will send an invitation for the kickoff.

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**From:** Ho, Yenhung <[Ho.Yenhung@epa.gov](mailto:Ho.Yenhung@epa.gov)>

**Sent:** Wednesday, October 14, 2020 12:06 PM

**To:** Shari Ring <[Shari.Ring@cadmusgroup.com](mailto:Shari.Ring@cadmusgroup.com)>; Rao, Kate <[Rao.kate@epa.gov](mailto:Rao.kate@epa.gov)>

**Cc:** Mary Ellen Tuccillo <[maryellen.tuccillo@cadmusgroup.com](mailto:maryellen.tuccillo@cadmusgroup.com)>

**Subject:** RE: [EXT] FW: Contract No. EP-C-15-022, WA No. 4-90; R9 UIC Tech Support -- Clean Energy Systems - Class VI UIC Permit Application # R9UIC-CA6-FY20-1 [Task 1; Subtask 1.2 - Permit Application Analysis]

How about send an invitation for 11-11:30am.

I will forward you and MaryEllen the state invitation for next Tuesday. No agenda is provided in the invitation, however, SWB stated the following:

*"We would like to discuss with you issues that were previously raised that weren't addressed and some new questions that are more technical in nature (geochemistry) that maybe the contractor could answer. CalGEM (Vincent and his team) also has questions and we are attempting to coordinate by having a single meeting hopefully avoid potentially redundant meetings."*

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**From:** Shari Ring <[Shari.Ring@cadmusgroup.com](mailto:Shari.Ring@cadmusgroup.com)>

**Sent:** Wednesday, October 14, 2020 8:35 AM

**To:** Ho, Yenhung <[Ho.Yenhung@epa.gov](mailto:Ho.Yenhung@epa.gov)>; Rao, Kate <[Rao.kate@epa.gov](mailto:Rao.kate@epa.gov)>

**Cc:** [MaryEllen.Tuccillo@cadmusgroup.com](mailto:MaryEllen.Tuccillo@cadmusgroup.com)

**Subject:** RE: [EXT] FW: Contract No. EP-C-15-022, WA No. 4-90; R9 UIC Tech Support -- Clean Energy Systems - Class VI UIC Permit Application # R9UIC-CA6-FY20-1 [Task 1; Subtask 1.2 - Permit Application Analysis]

We can do either of the Wed times – I prefer earlier. Want me to send an invitation for 1030-1130? I bet that's more time than we need.

The call with the state can be squeezed in between our other calls. We'll block it off. Is there an agenda?

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**From:** Ho, Yenhung <[Ho.Yenhung@epa.gov](mailto:Ho.Yenhung@epa.gov)>

**Sent:** Wednesday, October 14, 2020 11:29 AM

**To:** Shari Ring <[Shari.Ring@cadmusgroup.com](mailto:Shari.Ring@cadmusgroup.com)>; Rao, Kate <[Rao.kate@epa.gov](mailto:Rao.kate@epa.gov)>

**Cc:** Mary Ellen Tuccillo <[maryellen.tuccillo@cadmusgroup.com](mailto:maryellen.tuccillo@cadmusgroup.com)>

**Subject:** RE: [EXT] FW: Contract No. EP-C-15-022, WA No. 4-90; R9 UIC Tech Support -- Clean Energy Systems - Class VI UIC Permit Application # R9UIC-CA6-FY20-1 [Task 1; Subtask 1.2 - Permit Application Analysis]

Next Wednesday 10:30am-12pm, and 1-2pm PST work for me.

Also, we are having another call with the CA agencies regarding the review of CES's C6 application. David just confirmed with the state that they want to have the call 10-11am PST next Tuesday (10/20). Will that overlaps with your calls?

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**From:** Shari Ring <[Shari.Ring@cadmusgroup.com](mailto:Shari.Ring@cadmusgroup.com)>

**Sent:** Wednesday, October 14, 2020 8:14 AM

**To:** Ho, Yenhung <[Ho.Yenhung@epa.gov](mailto:Ho.Yenhung@epa.gov)>; Rao, Kate <[Rao.kate@epa.gov](mailto:Rao.kate@epa.gov)>

**Cc:** [MaryEllen.Tuccillo@cadmusgroup.com](mailto:MaryEllen.Tuccillo@cadmusgroup.com)

**Subject:** RE: [EXT] FW: Contract No. EP-C-15-022, WA No. 4-90; R9 UIC Tech Support -- Clean Energy Systems - Class VI UIC Permit Application # R9UIC-CA6-FY20-1 [Task 1; Subtask 1.2 - Permit Application Analysis]

Ack. Those times overlap with calls we have Tuesday.

How's next Wednesday look? We are free all day except 12-12:30 PT; we are also free Thursday any time after 9:00 AM except 11-12.

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**From:** Ho, Yenhung <[Ho.Yenhung@epa.gov](mailto:Ho.Yenhung@epa.gov)>

**Sent:** Wednesday, October 14, 2020 10:58 AM

**To:** Shari Ring <[Shari.Ring@cadmusgroup.com](mailto:Shari.Ring@cadmusgroup.com)>; Rao, Kate <[Rao.kate@epa.gov](mailto:Rao.kate@epa.gov)>

**Cc:** Mary Ellen Tuccillo <[maryellen.tuccillo@cadmusgroup.com](mailto:maryellen.tuccillo@cadmusgroup.com)>

**Subject:** RE: [EXT] FW: Contract No. EP-C-15-022, WA No. 4-90; R9 UIC Tech Support -- Clean Energy Systems - Class VI UIC Permit Application # R9UIC-CA6-FY20-1 [Task 1; Subtask 1.2 - Permit Application Analysis]

Hi Shari,

Sure. I will be on leave next Monday but should be available 8:30am-9:30am, and 11am-12:30pm PST next Tuesday.

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**From:** Shari Ring <[Shari.Ring@cadmusgroup.com](mailto:Shari.Ring@cadmusgroup.com)>

**Sent:** Wednesday, October 14, 2020 5:24 AM

**To:** Rao, Kate <[Rao.kate@epa.gov](mailto:Rao.kate@epa.gov)>

**Cc:** Ho, Yenhung <[Ho.Yenhung@epa.gov](mailto:Ho.Yenhung@epa.gov)>; MaryEllen.Tuccillo@cadmusgroup.com

**Subject:** RE: [EXT] FW: Contract No. EP-C-15-022, WA No. 4-90; R9 UIC Tech Support -- Clean Energy Systems - Class VI UIC Permit Application # R9UIC-CA6-FY20-1 [Task 1; Subtask 1.2 - Permit Application Analysis]

Thanks, Kate.

Calvin, would it be ok to have the kick off call on Monday or Tuesday so that we have a chance to glance at the specific responses?

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**From:** Rao, Kate <[Rao.kate@epa.gov](mailto:Rao.kate@epa.gov)>

**Sent:** Tuesday, October 13, 2020 7:36 PM

**To:** Shari Ring <[Shari.Ring@cadmusgroup.com](mailto:Shari.Ring@cadmusgroup.com)>

**Cc:** Ho, Yenhung <[Ho.Yenhung@epa.gov](mailto:Ho.Yenhung@epa.gov)>; Albright, David <[Albright.David@epa.gov](mailto:Albright.David@epa.gov)>

**Subject:** [EXT] FW: Contract No. EP-C-15-022, WA No. 4-90; R9 UIC Tech Support -- Clean Energy Systems - Class VI UIC Permit Application # R9UIC-CA6-FY20-1 [Task 1; Subtask 1.2 - Permit Application Analysis]

Hi Shari.

Below is more technical direction for the CES project. This falls under the initial TDM we issued on 6/30/2020 for WA 5-90. Please let me know if you have questions. Calvin would like a kick-off call for this effort. Please work with him to schedule it as soon as you can.

Thanks. Kate

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**Contract No. EP-C-15-022, Workplan Assignment No. 5-90**

**R9 Tech Support for Implementation of the UIC Program – Clean Energy Systems - Class VI UIC Permit Application # R9UIC-CA6-FY20-1 [Task 1; Subtask 1.2 – Technical Review Analysis]**

### Technical Direction

**Background:** On August 19, 2020, EPA provided CES with technical evaluation comments on the site characterization information submitted as part of the permit application. On September 30, 2020, CES provided responses to EPA's comments.

**Action:** Under Task 1, SubTask 1.2, review and provide an evaluation of the below sub-set of CES's responses. If the responses do not provide sufficient information, please provide evaluation and discussion under this technical review TDM.

1 and 1.1

3.1 and 3.2

5.1

6.1.1, 6.1.2 and 6.2.1

7.1, 7.2, 7.3 and 7.5

8.1

9.1

10.1  
11.1  
12.1  
13.1  
16  
17

**Deliverable:** Provide a technical analysis report evaluating CES's responses to EPA technical comments. The report should include an itemized list of additional information necessary to clarify, modify, or supplement the permit application material. Deliverable should be emailed in WORD to Kate Rao and Calvin Ho.

**Estimated LOE:** 50 hours

**Schedule:** 4 - 6 weeks from the Kick-off call.

**Kick-off Call:** Cadmus will set up a call with Calvin once TDM is received. Goal of call is to discuss the TDM, LOE, and due date of deliverable.

**Material to Review:**

- CES's 9/30 Responses to EPA Technical Review Comments (Cadmus received a copy of the response from CES on Oct 1, 2020)

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Kate Rao  
Groundwater Protection Section (WTR 4-2)  
USEPA Region 9  
75 Hawthorne Street, San Francisco, CA 94105  
tel: (415) 972-3533 / fax: (415) 947-3549

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**From:** Rao, Kate

**Sent:** Tuesday, June 30, 2020 9:00 AM

**To:** [Shari.Ring@cadmusgroup.com](mailto:Shari.Ring@cadmusgroup.com)

**Subject:** FW: Contract No. EP-C-15-022, WA No. 4-90; R9 UIC Tech Support -- Clean Energy Systems - Class VI UIC Permit Application # R9UIC-CA6-FY20-1 [Task 1; Subtask 1.2 - Permit Application Analysis]

Hi Shari.

On April 16<sup>th</sup> I sent you the below TDM for tech support under WA 4-90. This email is 're-issuing' the TDM so work on this project can continue in WA 5-90 which starts tomorrow. The deliverable is due mid July and additional support surrounding the tech review may be needed after we received the deliverable.

If you have any questions, please let me know.

Thanks. Kate

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Kate Rao  
Groundwater Protection Section (WTR 4-2)  
USEPA Region 9  
75 Hawthorne Street, San Francisco, CA 94105  
tel: (415) 972-3533 / fax: (415) 947-3549

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**From:** Rao, Kate

**Sent:** Thursday, April 16, 2020 11:46 AM

**To:** [Shari.Ring@cadmusgroup.com](mailto:Shari.Ring@cadmusgroup.com)

**Cc:** Albright, David <[Albright.David@epa.gov](mailto:Albright.David@epa.gov)>; Ho, Yenhung <[Ho.Yenhung@epa.gov](mailto:Ho.Yenhung@epa.gov)>

**Subject:** Contract No. EP-C-15-022, WA No. 4-90; R9 UIC Tech Support -- Clean Energy Systems - Class VI UIC Permit Application # R9UIC-CA6-FY20-1 [Task 1; Subtask 1.2 - Permit Application Analysis]

Hi Shari –

Below is a new work initiation request. Calvin is the tech lead and I understand you will be the lead for all Class VI technical reviews. Calvin will schedule a Kick-off call with you and share the OneDrive link. If you have any questions, please let me know.

Thanks. Kate

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**Contract No. EP-C-15-022, Workplan Assignment No. 4-90**

**R9 Tech Support for Implementation of the UIC Program – Clean Energy Systems - Class VI UIC Permit Application # R9UIC-CA6-FY20-1 [Task 1; Subtask 1.2 - Permit Application Analysis]**

#### **Technical Direction**

**Background:** California Energy Systems (CES) plans to develop a former biomass plant located in Mendota, California into a carbon negative energy (CNE) plant. The Mendota CNE plant uses local agricultural and urban wood wastes as feedstock to produce syngas, which is then separated into H2 for transportation fuel and H2-depleted syngas for electricity generation. CES plans to compress the CO2 produced during the electricity generation process to a supercritical state and inject it deep into the subsurface for geologic sequestration.

In February 2020, EPA received CES's UIC Class VI Pre-Construction permit application via the Geologic Sequestration Data Tool (GSDT) for a new injection well at the CES Mendota Plant in California. EPA determined that the application contains the information required by the GSDT.

**Action:** Under Task 1, Subtask 1.2 – Technical Review Analysis, review and provide an evaluation of CES's permit application. Note: if it is determined that additional material is needed from the applicant, Cadmus will be requested to perform additional reviews under this TDM until the application is determined to meet all federal UIC technical requirements.

**Deliverable:** Provide a technical analysis report summarizing the results for the technical review of CES's permit application. The report should include an itemized list of additional information necessary to clarify, modify, or supplement the permit application material. Deliverable should be emailed in WORD to Kate Rao and Calvin Ho.

**Estimated LOE:** 180 hours

**Schedule:** Due 8 weeks from the date of the Kick-off Meeting.

**Kick-off Call:** Calvin will schedule a call with the Cadmus tech lead once the material is received to discuss the TDM.

**Material to Review** (available at the shared OneDrive Folder <CES Mendota UIC Permit Application>):

- Section 4 (Reviewing Pre-Construction Information) of the UIC Program Class VI Implementation Manual [see OneDrive Folder]
- Class VI Permit Application Narrative [see subfolder <ProjInfo>]
- Attachment A, Summary of Requirements Class VI Operating and Reporting Conditions [see subfolder <ProjInfo>]

- Attachment B, Area of Review and Corrective Action Plan and all files associated with the attachment [see subfolder <AoRModeling>]
- Attachment C, Testing and Monitoring Plan & Testing and Monitoring Spreadsheet [see subfolder <ProjPlan> & subfolder <PreOpTest>]
- Attachment D, Injection Well Plugging Plan [see subfolder <ProjPlan>]
- Attachment E, Post-Injection Site Care and Site Closure Plan [see subfolder <ProjPlan>]
- Attachment F, Emergency and Remedial Response Plan [see subfolder <ProjPlan>]
- Attachment G, Construction Details [see subfolder <PreOpTest>]
- Quality Assurance and Surveillance Plan [see subfolder <ProjPlan>]

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Kate Rao  
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tel: (415) 972-3533 / fax: (415) 947-3549

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